

# PATENT SPECIFICATION

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DRAWINGS ATTACHED

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## (54) MOTOR VEHICLE DOOR LATCH MECHANISM

(71) We, FRITZ KEIPER, a German Company, of Buchelstrasse 56-58, Remscheid-Hasten, Germany, do hereby declare that the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

The invention concerns a motor vehicle door latch mechanism.

According to the invention there is provided a motor vehicle door latch mechanism comprising a keeper to be fixed to a door post and a latch to be fixed to a cooperating door, a bolt mounted at an inner of its ends in a latch plate of the latch and movable into a release position, by means of a first release member formed by a double-armed lever having counter-balanced lever arms pivotally mounted on one lever arm of a rocking lever, the rocking lever having two arms which are counter-balanced and being securable in one or the other of two extreme positions, such that in one extreme position the first release member takes up an effective position, in which operation thereof is effective to move the bolt into its release position, and such that in the other extreme position the first release member takes up an ineffective position in which the latch is locked and operation of the first release member is not effective to move the bolt to its release position.

The counter-balanced lever arms of the first release lever and rocking lever prevent forces due to high acceleration or deceleration of the motor vehicle causing turning movement of the levers about their pivots, which movements could otherwise cause a door latch mechanism to be inadvertently released with serious consequences.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:—

Figure 1 shows a side view of a motor vehicle door latch mechanism according to the invention;

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Figure 2 shows a section taken along the line II-II of Figure 1;

Figure 3 shows a section taken along the line III-III of Figures 2;

Figure 4 shows an elevation of a keeper;

Figure 5 shows a partly cut-away side view of the motor vehicle door latch mechanism according to the invention with the door latch mechanism latched;

Figure 6 shows a section taken along line VI-VI of Figure 5;

Figure 7 shows a partly cut-away view similar to Figure 6 of a modified motor vehicle door latch mechanism, with the bolt in its normal position;

Figure 8 shows a view corresponding to Figure 7, but with the bolt in a position corresponding to a safety latched position;

Figure 9 shows a view corresponding to Figure 8, wherein the door latch mechanism is locked;

Figure 10 shows a side view of another embodiment of a motor vehicle door latch mechanism according to the invention;

Figure 11 shows a section taken along the line XI-XI of Figure 10;

Figure 12 shows a side view of the motor vehicle door latch mechanism of Figure 10, wherein the bolt is moved into the release position with the second release member to be operated from the inside of the door;

Figure 13 shows a section taken along the line XIII-XIII of Figure 12;

Figure 14 shows a side view of the motor vehicle door latch mechanism of Figure 10 wherein the latch is locked from the outside of the door, and

Figure 15 shows a section taken along the line XV-XV of Figure 14.

The motor vehicle door latch mechanism illustrated in Figures 1 to 6 comprises a latch to be fixed to a door (not shown) and a keeper 21 to be fixed to a door post (not shown). The latch 20 is provided with a bolt 23 projecting at a right angle out of a latch plate 22. The bolt 23 is mounted in a

bush 24 extending up to the end of the bolt 23 which engages in the keeper 21, said bush 24 in turn being mounted in the latch plate 22. The mounting bush 24 is provided in its central region with a recess 25 which permits contact faces 28, 29 of the keeper 21 which are formed by projections 26, 27 to engage against the bolt 23. The recess is milled transversely to the longitudinal centre line of the bush 24 to remove part of the top half of the bush 24.

The bolt 23 which is generally cylindrical is provided in the region of the recess 25 at its region which cooperates with the contact faces 28, 29 of the keeper 21, with an inclined face 30 by milling away until a substantially semi-circular cross section is formed. This inclined face 30, as particularly apparent from Figure 4, extends at an angle to the direction of closing. To release the bolt from the keeper, the inclined face is turned parallel to the closing direction, in a manner still to be described so that the bolt 23 is released from the projections 26, 27 of the keeper. When the door is slammed the inclined face 30 strikes against the backs 31, 32 of projections 26, 27 of the keeper 21 and pivots the bolt 23 until it engages behind the projections 26, 27.

The bolt 23 lies with its contact face 33 formed by the cylindrical surface, against the contact faces 28 or 29 of projections 26 or 27 of the keeper 21. The contact faces 28, 29 formed by the projections 26, 27 of the keeper 21 are of concave curvature corresponding to the convex contact face 33 of the bolt 23. This provides that even forces acting on the door in the direction of opening thereof do not exert any forces on the bolt 23 in the direction to cause rotation thereof.

As Figures 1 and 4 particularly show, the outer end of the bolt 23 mounted in the bush 24 engages into a recess 34 in the keeper 21, which extends in the closing direction. The projections 26, 27 which cooperate with the bolt 23 are provided on a steel plate 35, 36 which is arranged on the front side of the keeper 21 and which is divided in two in the region of the recess 34 to accommodate the bolt 23. The width of the recess 34 in the keeper 21 which accommodates the outer end of the bolt 23 mounted in the bush 24, is greater than the distance between the parts of the two-part plate 35, 36. The top part 35 of the plate is provided at its under edge with the projections 26, 27.

As Figure 2 particularly shows, a plate 37 is mounted at the inner end of the bolt 23. The plate 37 has an arm 38 to which is connected a helical traction spring 39 which is mounted at its other end on a bent portion 40 of the latch plate 22. The plate 37 is also provided with a lug 41 which cooperates with a bent portion 43 provided on a first re-

lease member 42. In this case the first release member 42 is formed by a double-armed lever with counter-balanced lever arms 44, 45. This provides in a simple manner that even under high acceleration or deceleration of the vehicle in any direction the door latch mechanism is not thereby unintentionally released. The first release member 42 is mounted by a pivot pin 46 on a lever arm 47 of a rocking lever 49, the rocking lever 49 being mounted on the latch plate 22 by a pivot pin 53 and having a lever arm 48 whereby it is counter-balanced. The first release member 42 has a fork-shaped bent portion 50 on its lever arm 45. A press button or a like operating device 51 provided on the outside of the door acts on said fork-shaped bent portion 50 so that the release member 42 can be pivoted in the counter-clockwise direction (as shown in Figure 2) about its pivot pin 46 and at the same time acts by means of its bent portion 43, provided on its lever arm 44, on the lug 41 of the plate 37 and pivots the plate 37 and thus the bolt 23 into the release position.

The rocking lever 49 is acted upon by a tilting spring 52 and lies in its two extreme positions against respective stops 54, 55 provided on the latch plate 22. The rocking lever 49 can be pivoted from the inside of the door by means of a button (not shown but provided on the window ledge of the door) connected by means of a rod 56 to a bent portion 57 of the lever arm 48 of the rocking lever 49, said bent portion 57 extending substantially parallel to the inside of the door. The bent portion 57 is provided with this purpose with a riveted pin 58.

In Figure 2 the rocking lever 49 is illustrated in a position in which the first release member 42 mounted thereon is effective if operated to release the bolt 23 from the keeper 21. The latch mechanism can thus be latched but is not locked. In contrast, Figure 6 shows the position of the rocking lever 49 in which the first release member 42 mounted thereon has been moved to a position in which it is ineffective to release the bolt 23 from the keeper 21. The latch is thus locked. Figure 6 also shows in dotted lines the position of the release member 42 which corresponds to its position when the press button provided on the outside of the door is pressed. As shown by the dotted lines, the path of movement of the bent portion 43 of the release member 42 passes above the lug 41 of the plate 37. Thereby the latch mechanism is not released when the press button 51 provided on the outside of the door is operated.

Connected to the lever arm 44 of the release member 42 is a helical traction spring 59, the other end of which is connected to a side wall 60 of the latch plate 130

22, which extends substantially parallel to the inside of the door. The first release member 42 is thus biased by the spring 59 into a normal position illustrated in solid lines in Figures 2 to 6, in which the first release member 42 lies with a bent portion 61 formed on the lever arm 44, against a stop 62 bent out of the plane of the latch plate 22. The stop 62 provided on the latch plate 22 is of such a length that the first release member 42 lies with its bent portion 61 against the stop 62, in its normal position both as illustrated in Figure 2 in its effective position and also as illustrated in Figure 6 in its ineffective position.

The lever arm 44 of the first release member 42 has a second bent portion 63 which, with the release member 42 in its normal and ineffective position cooperates with a back face 64 of the lug 41 provided on the plate 37 to prevent rotation thereof. As Figure 6 particularly shows, the bent portion 63 of the lever arm 44 of the release member 42 lies directly below the back face 64 of the lug 41 of the plate 37 when the first release member 42 is in its ineffective position, so that if the door is slammed, the first release member 42 is moved into its effective position by pivotal movement of the plate 37, due to the bolt 23 striking the keeper 21 and the latch mechanism is unlocked. In order to be able to retain the latch in the locked condition when closing the door, the latch 20 can be locked when the door is open by means of the locking knob provided on the window-ledge, and the door closed, with the press button 51 provided on the outside of the door depressed. As the dotted lines of Figure 6 particularly show, the path of movement of the back face 64 of the lug 41 provided on the plate 37 is beside the bent portion 63 of the release member illustrated in dotted lines in its operated position. Therefore when passing beneath the projections 26, 27 of the keeper 21 the bolt 23 with the plate 37 can take up the position illustrated in dotted lines in Figure 6, without the back face 64 of the lug 41 engaging the bent portion 63 of the release member 42.

If it is not desired that the latch should be lockable with the door open, the first release member 42 can be provided with a projection 65 (shown in Figure 2) on its lever arm 45 remote from the plate 37, which projection 65 cooperates in the ineffective position of the release member 42 with a stop 66 on the latch plate 22 and prevents pivotal movement of the first release member 42 into its operated position when, due to the position of the rocking lever 49, it is in its ineffective position. This achieves with simple means that when the latch is locked, the first release member 42 is prevented from pivotal movement to its

operated position and thus when the door is slammed, the back face 64 of the lug 41 of the plate 37 engages the bent portion 63 of the first release member 42 and moves the first release member 42 into its effective position. The stop 66 which cooperates with the projection 65 of the lever arm 45 is in this arrangement formed by a bent end portion of the latch plate 22.

As already mentioned, the plate 37 is provided with an arm 38, to which is connected a helical traction spring 39 mounted at its other end on the latch plate 22. By means of this spring, when the door is open, the plate 37 and therewith the bolt 23 are held in a normal position in which the plate 37 lies with a stop arm 67 thereof against a stop provided on the latch plate 22. This normal position taken up by the bolt 23 is illustrated in dotted lines in Figure 4 and is indicated by III. As the bolt 23 only takes up this position with the door in the open position, this position is referred to as the open position in other embodiment.

The stop arm 67 of the plate 37 engages with its free end into a slot (no reference numeral) which is provided in the side wall 60 of the latch plate 22 which extends substantially parallel to the inside wall of the door, and the stop arm 67 lying with the catch in the open position III, against the edge of the slot.

As particularly apparent from Figures 1 to 5, a second counter-balanced release lever 68 to operate the latch 20 from the inside of the door is mounted on the side wall 60 of the latch plate 22 by a pivot pin 69 and acts with an operating arm 70 on the stop arm 67 of the plate 37. Thereby the bolt 23 can also be moved into its release position from the inside of the door. The second release lever 68 is acted upon a helical traction spring 72 engaging on one arm 71 thereof and connected to the side wall 60, by means of which spring 72 the second release lever 68 is held in a normal position in which it lies with the operating arm 70 against a stop 73 provided on the side wall 60. The second release lever 68 is provided with a blocking arm 74 with an aperture for the connection of a remote-control device (not shown in greater detail) provided on the inside of the door. The bent arm 57 of the rocking lever 49 has a bent portion 76 which, with the rocking lever 49 in the position which corresponds to the ineffective position of the first release member 42, cooperates with the blocking arm 74 of the second release lever 68 and prevents operating movement of the second release member. This provides in a simple manner that when the latch 20 is locked, the door cannot be opened with the remote-control device provided on the inside of the door. Therefore to open the door latch, a lock prevent-

ing the button on the outside of the door being depressed must be unlocked or the locking knob provided on the windowledge must be operated from the inside of the door.

In the embodiment illustrated in Figures 7 to 9, the operative connection between the plate 37 and the first release member 42 has been modified. In this arrangement the plate 37 is provided with a pin 77 which cooperates with a hooked finger 78 formed on the first release member 42. As already mentioned, with the door in an open position the bolt 23 takes up the position illustrated in Figure 4 and designated III. As apparent from the drawings, the inclined face 30 of the bolt 23 extends in the open position III at an angle approximately 10 degrees greater than in the safety latched position II and in fully latched position I. In the open position III of the bolt 23, the hooked finger 78 engages around the pin 77, as Figure 7 particularly shows, so that the first release member 42, with the door in the open position, cannot be raised into its ineffective position, and therefore the latch 20 cannot be locked. Figure 8 shows the plate 37 in a position corresponding to the safety latched position II or the fully latched position I. In this position the pin 77 of the plate 37 still lies in the path of movement of the hooked finger 78 so that when the first release member 42 is moved to its operated position, the plate 37 and therewith the bolt 23 are moved into their release position, however until operative engagement between the pin 77 and the hooked finger 78 is reached the hooked finger 78 must carry out with the first member 42 a part of its pivotal movement until it comes into operative engagement with the pin 77 of the plate 37. This provides that the release member 42 can only be raised into its ineffective position when the bolt 23 is in its safety latched position II or its fully latched position I.

Figure 9 shows the first release member 42 in its ineffective position in which the path of movement of the hooked finger 78, when moving into its operated position, illustrated in dotted lines, lies above the pin 77.

In the embodiment illustrated in Figures 10 to 15 the latch 20 is operated from the inside of the door only with a remote-control device (not illustrated) so that by means of this remote-control device the latch mechanism can be released so that the door can be opened and also the latch can be locked and unlocked.

The remote-control device (not illustrated) is connected to an arm 79 of the second release lever 68 which is provided for this purpose with an aperture 80. The arm 48 remote from the first release member 42, of

the rocking lever 49 mounted on the latch plate 22 is operatively connected to the second release member 68 by means of a rod 81. For this purpose the arm 48 of the rocking lever 49 has a bent portion 82 with an aperture 83 therein in which the rod 81 provided with a bent end portion 84 is displaceably mounted. The other end of the rod 81 engages with its bent end 85 into an aperture 86 provided in the operating arm 75 70 of the second release lever 68. In this arrangement the bent end 85 of the rod 81 is held in the aperture 86 by means of a spring clip 87. The spring clip 87 is tubeshaped at its one end and has the rod 81 80 passing through it, while the other end engages around the operating arm 70 of the second release lever 68. Mounted on the rod 81 is a helical compression spring 88 which bears at one end against the spring clip 87 and at the other end against the bent portion 82 of the rocking lever 49.

Figures 10 and 11 show the second release member 68 in its normal position. The second release member 68 can be pivoted in a counter-clockwise direction out of this position by means of the remote-control device provided on the inside of the door, so that the operating arm 70 pivots the plate 95 37 in the clockwise direction by engagement with the stop arm 67 so that the bolt 23 is moved into its release position, whereby the door can be opened. This position of the second release member 68 and the plate 100 37 is illustrated in Figures 12 and 13. The rod 81 connected to the operating arm 70 is thereby displaced in the aperture 83 in the rocking lever 49, the helical compression spring 88 being compressed.

The second release lever 68 can also be pivoted in the clockwise direction by means of the remote-control device provided on the inside of the door. The position of the upper part of the second release lever 68 110 when so pivoted is illustrated in dotted lines in Figure 14. When the second release lever 68 is moved into this locking position, the rocking lever 49 is entrained by the bent end portion 84 and pivoted into the position in 115 which it is illustrated in Figure 15. In this position the first release member 42 is moved to its ineffective position and the latch 20 is thus locked. Figures 14 and 15 illustrate in solid lines the second release 120 lever 68 in the position in which the release lever 68 has already been pivoted back out of the locking position into the normal position, although the rocking lever 49 is still in its position corresponding to the locking 125 position of the latch 20. By pivoting the second release lever 68 back into the normal position in this manner, the helical compression spring 88 is put under tension until the force becomes so great that the 130

rocking lever 49 returns to its normal position.

Attention is drawn to our copending application No. 45149/68 (Serial No. 1214885); Claim 1 of which reads:—

A motor vehicle latch mechanism comprising a keeper to be fixed to a door post and a latch to be fixed to a cooperating door; a bolt mounted in a latch plate of the latch in a manner such that when the door is closed the bolt cooperates with one of two contact faces of the keeper in either a safety latched position or a fully latched position, the bolt and a plate provided on the inner end of the bolt taking up different positions relative to the latch plate in the safety latched position and the fully latched position; and a first release member which can be operated to move the bolt into a release position necessary to open the door, and can also be moved into an ineffective position thereby to lock the latch, and a projection on each of the plate and the first release member which prevent the first release member moving into its ineffective position in the safety latched position.

#### WHAT WE CLAIM IS:—

1. A motor vehicle door latch mechanism comprising a keeper to be fixed to a door post and a latch to be fixed to a cooperating door, a bolt mounted at an inner of its ends in a latch plate of the latch and movable into a release position, by means of a first release member formed by a double-armed lever having counter-balanced lever arms pivotally mounted on one lever arm of a rocking lever, the rocking lever having two arms which are counter-balanced and being securable in one of the other of two extreme positions, such that in one extreme position the first release member takes up an effective position, in which operation thereof is effective to move the bolt into its release position, and such that in the other extreme position the first release member takes up an ineffective position in which the latch is locked and operation of the first release member is not effective to move the bolt to its release position.

2. A motor vehicle door latch mechanism according to claim 1, in which the rocking lever is acted upon by a tilting spring, is mounted on the latch plate and lies in each of its two extreme positions against a respective stop provided on the latch plate.

3. A motor vehicle door latch mechanism according to claim 1 or claim 2, in which the first release member is adapted to lie in a normal position with a projection on the lever arm which cooperates with a plate mounted at the inner end of the bolt, against a stop provided on the latch plate, under the action of a spring.

4. A motor vehicle door latch mechanism according to claim 3, in which the stop pro-

vided on the latch plate is of such a length that the first release member lies with its projection against the stop both in its effective position and in its ineffective position.

5. A motor vehicle door latch mechanism according to claim 3 or claim 4, in which the first release member has a first stop on its lever arm adjacent the plate, which first stop cooperates with one face of a lug provided on the plate in the effective position of the first release member.

6. A motor vehicle door latch mechanism according to any one of claims 3 to 5, in which the first release member has a second stop on its lever arm adjacent the plate, which second stop cooperates in a normal position of the first release member, with an opposite face of the lug provided on the plate.

7. A motor vehicle door latch mechanism according to any one of claims 3 to 6, in which the first release member has a projection on its lever arm remote from the plate, which projection cooperates in the ineffective position of the first release member, with a stop on the latch plate and prevents the first release member from being pivoted into an operated position.

8. A motor vehicle door latch mechanism according to claim 7, in which the stop which cooperates with the projection of the lever arm remote from the plate is formed by a portion of the latch plate bent out of the plane thereof.

9. A motor vehicle door latch mechanism according to any one of claims 3 to 8, in which the first release member has on its lever arm remote from the plate a fork-shaped bent portion to extend substantially parallel to the outer wall of a door in which the latch is installed.

10. A motor vehicle door latch mechanism according to any one of claims 3 to 9, in which the plate has an arm to which is connected a spring secured to the latch plate, by means of which spring the plate and therewith the bolt is held, when the door is in the open position, in a normal position with a stop arm of the plate lying against a stop provided on the latch plate.

11. A motor vehicle door latch mechanism according to claim 10, in which the stop arm of the plate engages with its free end into a slot provided in a side wall of the latch plate, which slot is provided to extend substantially parallel to the inner wall of a door in which the latch is installed, the stop arm lying against the edge of the slot when the bolt is in the normal position.

12. A motor vehicle door latch mechanism according to claim 11, in which a second counter-balanced release lever is mounted on the side wall of the latch plate, is operable to move the bolt into the release position and acts with an operating arm on

the stop arm of the plate.

13. A motor vehicle door latch mechanism according to claim 12, in which the second release lever is acted upon by a spring engaging on one arm thereof and connected to the side wall of the latch plate, by means of which spring the second release lever is held in an end position so that it lies with its operating arm against a stop provided on the side wall of the latch plate.

14. A motor vehicle door latch mechanism according to any one of claims 1 to 13, in which the other arm of the rocking lever, which is remote from the first release member is bent to extend substantially parallel to the inside of a door in which the latch is installed and has a rivetted pin for the connection thereto of a locking button.

15. A motor vehicle door latch mechanism according to claim 14, as appendant to claim 12 or claim 13, in which the bent portion of said other arm of the rocking lever has a bent portion which, with the rocking lever in the position corresponding to the ineffective position of the first release member, cooperates with a blocking arm of the second release member and blocks said second release member.

16. A motor vehicle door latch mechanism according to claim 15, in which the blocking arm includes an aperture for the connection of a remote-control device to be provided on the inside of a door in which the latch is installed.

17. A motor vehicle door latch mechanism according to claim 12, in which the other arm of the rocking lever, remote from the first release member, is operatively connected to the second release member.

18. A motor vehicle door latch mechanism according to claim 17, in which the other arm of the rocking lever remote from the first release member, has a bent portion with an aperture therein, a rod with a bent end portion passing through said aperture and being mounted at its other end on the operating arm of the second release member.

19. A motor vehicle door latch mechanism according to claim 17 or claim 18, in which the other end of the rod is also bent and engages in an aperture in the operating arm and a helical compression spring is placed on the rod, said spring bearing at one end against a stop and at the other end against the bent portion of the rocking lever.

20. A motor vehicle door latch mechanism according to claim 19, in which the bent end of the rod, which engages into the aperture in the operating arm is held in position with a spring clip placed on the rod.

21. A motor vehicle door latch mechanism according to any one of claims 17 to 20, in which the second release member has an arm with an aperture for the connection of a remote-control device to be provided on the inside of a door in which the latch is installed whereby the latch mechanism can be locked.

22. A motor vehicle latch mechanism according to any one of claims 3 to 21, in which the bolt and the plate are in different positions in the open position of the door, with respect to the position which they take up in a safety latched position and a fully latched position, and the plate and the first release member are provided with stops which, with the door in the open position, prevent the release member moving into the ineffective position.

23. A motor vehicle door latch mechanism according to claim 22, in which in the open position of the door, the bolt with the plate are rotated through an angle of approximately ten degrees with respect to the position taken up in the safety latched position and the fully latched position.

24. A motor vehicle door latch mechanism according to claim 22, in which the stop provided on the plate which prevents the first release member moving into the effective position is formed by a rivetted pin.

25. A motor vehicle door latch mechanism according to claim 24, in which the stop provided on the first release member is formed by a hooked finger engaging in the direction of the locking movement of the release member, behind the pin of the plate with the door in the open position.

26. A motor vehicle door latch mechanism substantially as hereinbefore described and illustrated with reference to Figures 1 to 6, Figures 7, 8 and 9, Figures 10 and 11, Figures 12 and 13 or Figures 14 and 15 of the accompanying drawings.

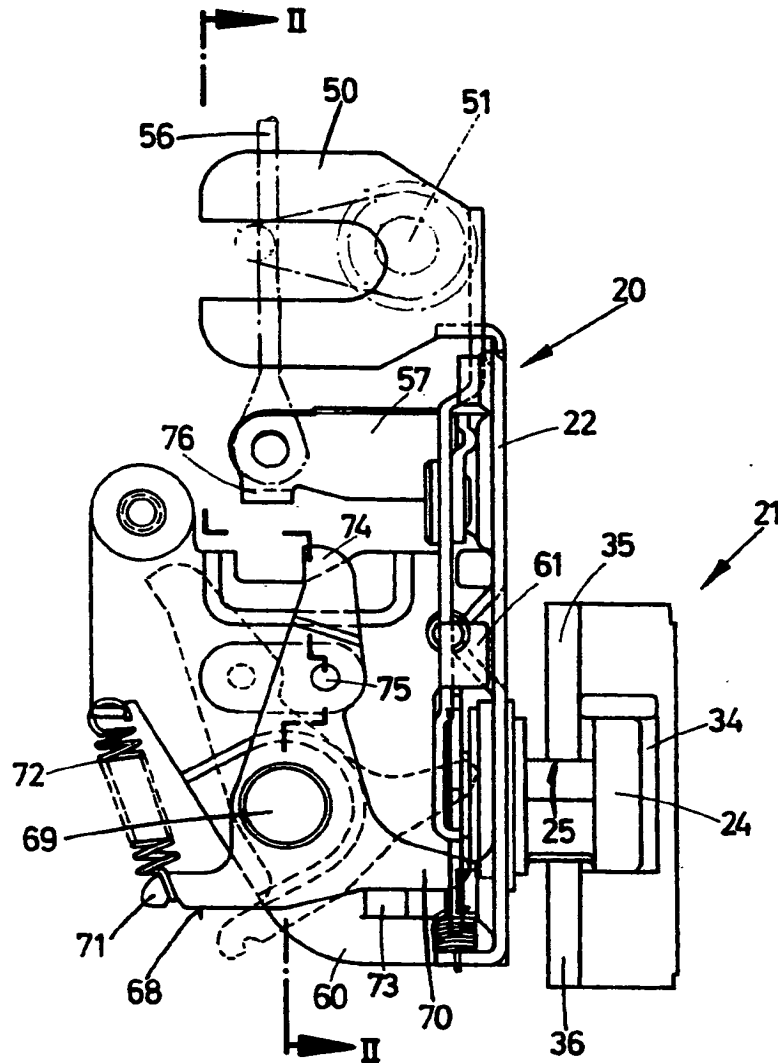
For the Applicants,  
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Chartered Patent Agents  
9 Staple Inn,  
London, W.C.1.

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COMPLETE SPECIFICATION

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the Original on a reduced scale.  
SHEET 1*

FIG.1



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**SHEET 2**

FIG. 3

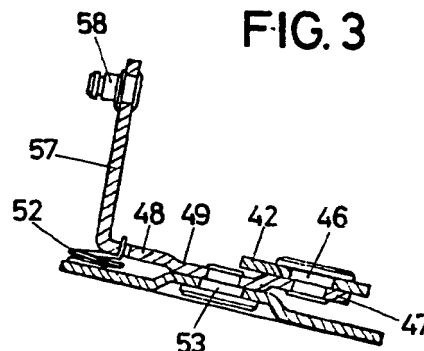


FIG. 2

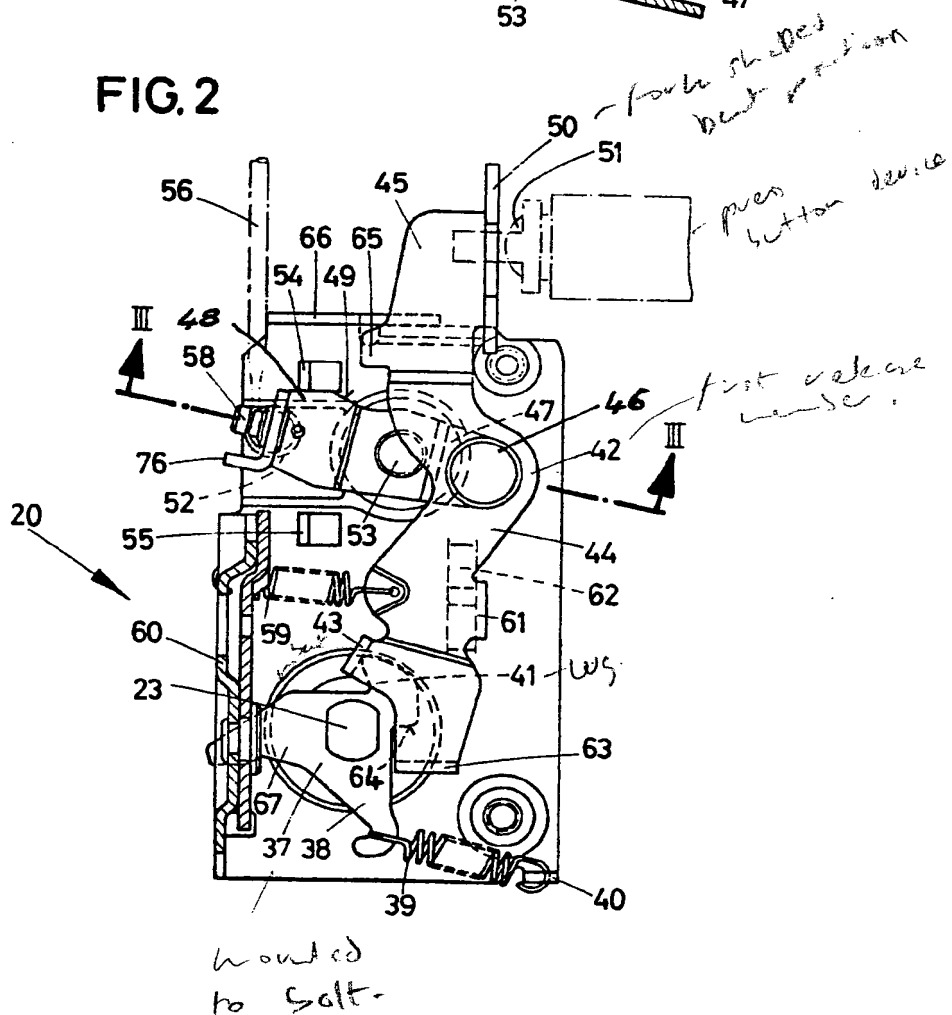


FIG. 4

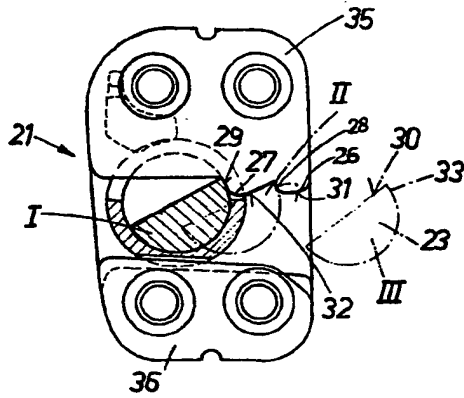


FIG. 6

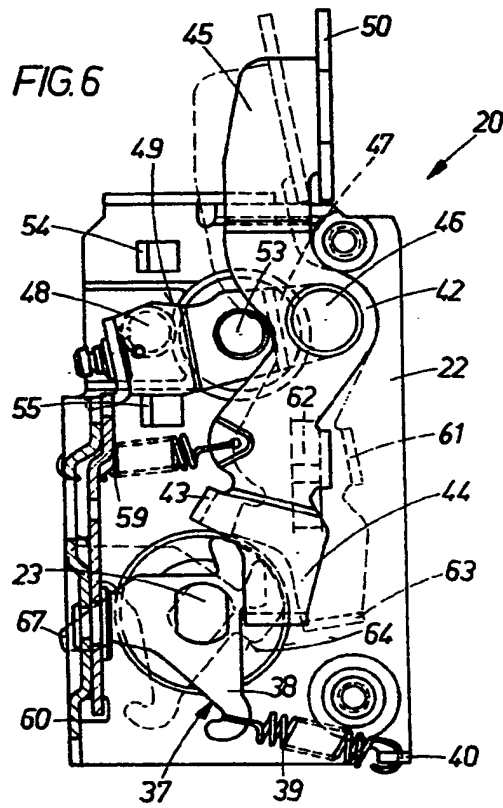


FIG. 5

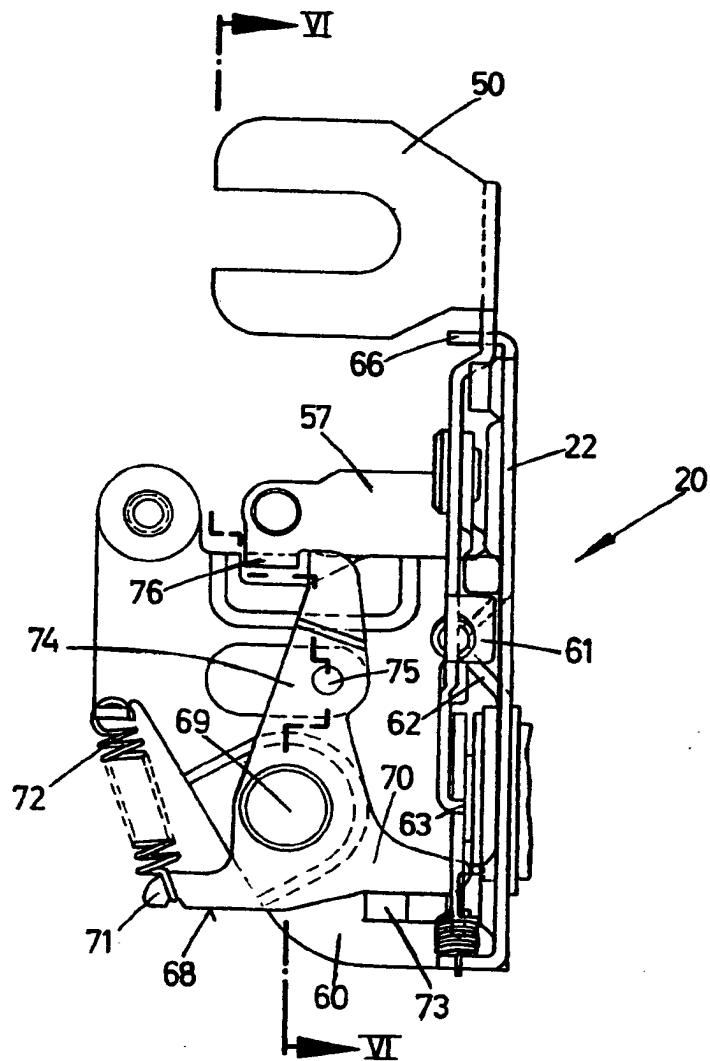


FIG.9

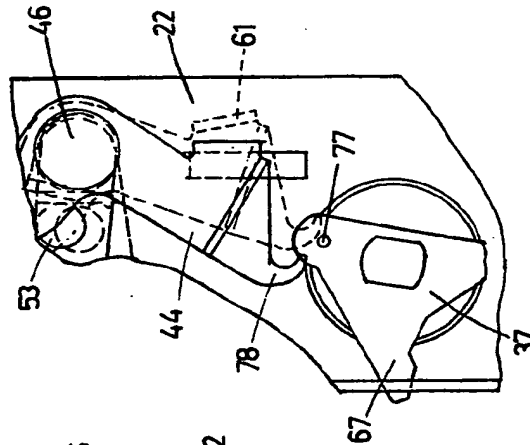


FIG.8

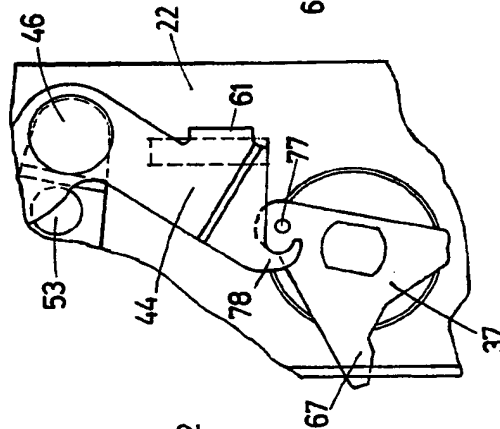
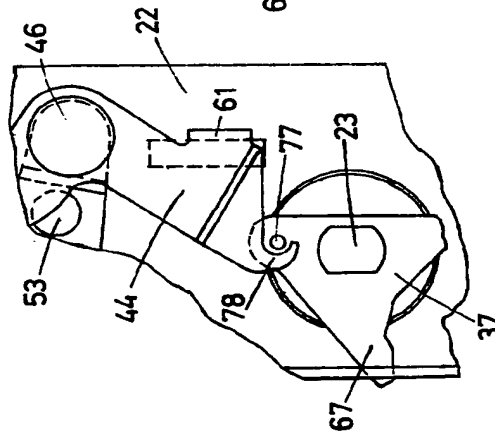


FIG.7



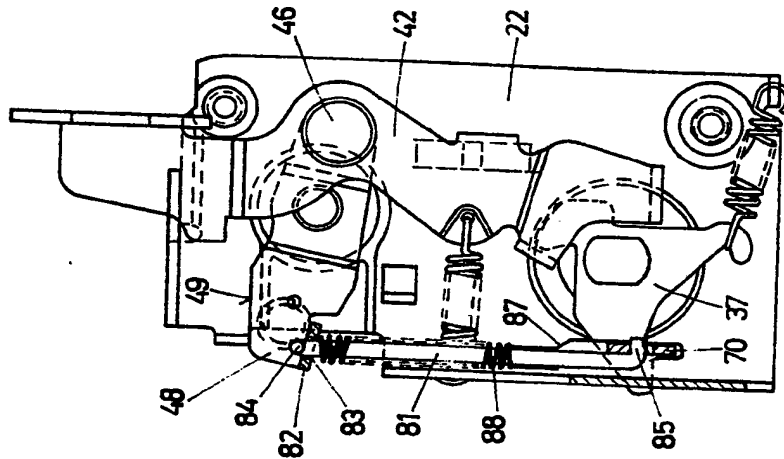
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**SHEET 6**

**FIG. 11**



**FIG. 10**

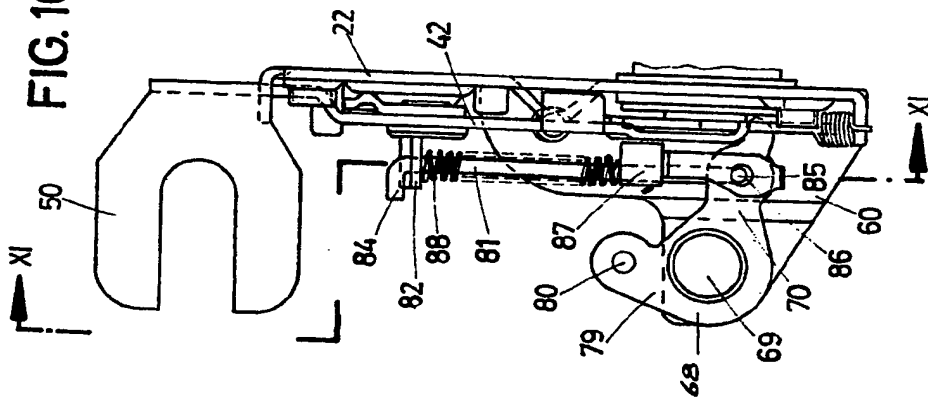


FIG.13

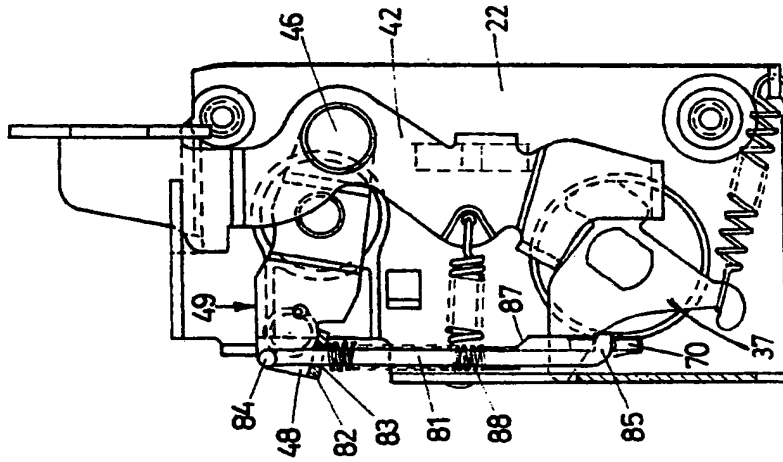
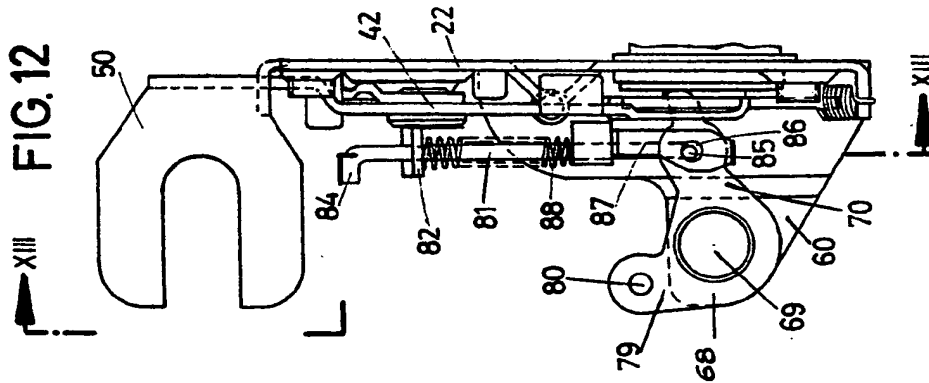


FIG.12



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SHEET 8

FIG 15

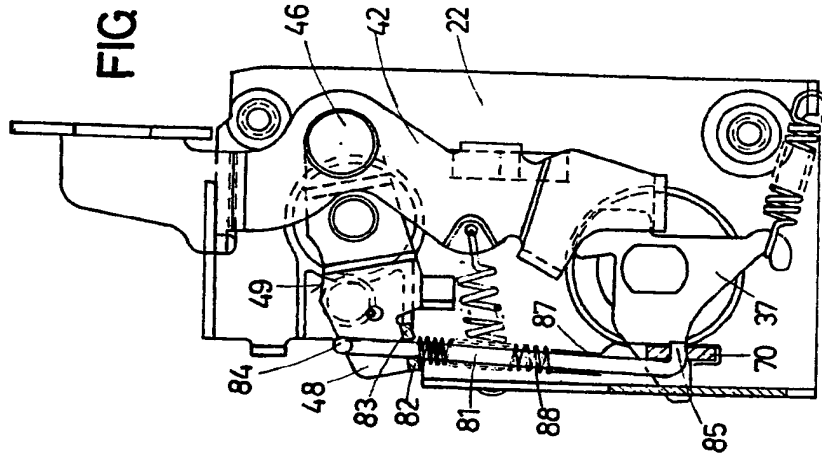


FIG.14

